CROP TALK

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What Corn Yield Do I Use For the N Calculator?

by Keith Reid, Soil Fertility Specialist, OMAFRA

Many of you will have harvested more corn per acre last fall than you ever had before. Some of you will be wondering whether you should just use that yield number in figuring out your N recommendations. After all, we know that corn removed a lot of nitrogen, and with high corn prices you don't want to miss out on any yield.

The reality is that, while yield is one component of the N requirements for your crop there are a lot of other factors that are just as important. Simply adding more N will not overcome too much or too little water, or a soil that just doesn't allow good root development. The yields in 2010 came from more efficient use of the nitrogen that was already in the soil, so there were fewer losses to the air and water than normal. While there was increased uptake, there was also increased return to the soil of the nutrients in the crop residue, so this big crop did not "empty out" the soil reserve.

Going forward into the 2011 cropping season, you should increase the yield number you use in the corn N calculator, but only by the extent it increased your average yield. In other words, if you had been growing 140 bushel per acre corn on average, and in 2010 you harvested 200 bushels of corn, your average yield for the past 5 years would increase to 155 bushels of corn. This will increase your N recommendation by about 12 pounds per acre (13.4 kg/ha).

Shooting for higher yield goals than this would be like buying lottery tickets, except the potential payout is only about what you spent on the tickets and the chances of winning are about the same as the lottery. Gradual increments will keep your expenses in line while matching your N applications to what the crop needs.

Cropline 1-888-449-0937

Ministry of Agriculture, Food and Rural Affairs
Ontario

Comparing Herbicide Programs in Identity Preserved (IP) Soybeans

by Mike Cowbrough, Weed Specialist, OMAFRA & François Tardif, Clarence Swanton and Peter Sikkema, University of Guelph

Field studies at Elora and Woodstock have evaluated soybean herbicide treatments based on their weed control efficacy and the yield protection they provided. Important differences were found among those treatments (Table 1).

Table 1. Average visual control of broadleaf and grassy weeds and soybean yield (bu/ac) with various herbicide programs in 2009 and 2010.

Treatment	% Control		Yield (bu/ac)
	Broadleaves	Grasses	
Conquest + Valtera*	88	97	46.1
Boundary (PRE) followed by Reflex + Pinnacle + Assure II (POST)*	94	100	45.0
Dual II Magnum + Sencor + Lorox	89	100	44.8
Broadstrike RC + Boundary*	89	99	44.5
Conquest	80	88	44.5
Pursuit + Valtera*	90	92	44.1
Pursuit	75	80	44.0
Broadstrike RC + Dual II Magnum	77	96	43.5
Frontier (PRE) Cleansweep (POST)	80	100	43.4
Boundary (low rate)	81	97	42.4
Boundary (low rate) + Classic*	85	98	41.4
Cleansweep	73	90	40.6
untreated	0	0	14.7

*Not labeled tank-mixes, but may be used under the memorandum by the Pest Management Regulatory Agency regarding the use of unlabelled tank mixes. Contact the manufacturer of each product first before using to identify if they support the proposed tank-mix.

Weed species present in field trials: barnyard grass, crabgrass (Large), foxtail (green), witchgrass, lamb's quarters, mustard (wild), pigweed (green and redroot), ragweed (common), vetch (tufted).

Notes: Pigweed populations existed in the trials that were resistant to group 2 herbicides (e.g. Pursuit, Pinnacle, Classic, Broadstrike RC) and lambsquarters populations that were resistant to triazine herbicides (e.g. Sencor).

Strategies for Managing Grower Identified "Worst Weeds" In IP Soybeans

Tufted Vetch

It is extremely difficult to control a perennial legume plant in an annual legume crop. Of all herbicide programs tested, Boundary applied pre-emergence followed by Reflex + Pinnacle + Assure II provided the highest level of vetch control, albeit less than 80% visual control, the minimum level of control for a weed to be listed on a product label. (Table 2)

Table 2: Control of Tufted Vetch in soybean with herbicide programs evaluated in 2009-2010.

Treatment	Tufted Vetch Control %
Boundary (PRE) followed by Reflex + Pinnacle + Assure II (POST)*	74
Broadstrike RC + Boundary*	67
Dual II Magnum + Sencor + Lorox	62
Pursuit + Valtera*	59
Conquest + Valtera*	52
All other treatments	Less than 50

Nightshade

The challenge with nightshade is that populations exist that are resistant to Broadstrike RC and Pursuit. The emergence pattern of nightshade also presents a challenge in that generally it has two peak emergence periods beginning in mid-May and then again in mid-June and can germinate and survive in low-light environments such as a soybean crop canopy. Therefore "two-pass" strategies have proven more consistent at controlling nightshade. (Table 3)

Table 3. Comparative control and range in control of nightshade with herbicides applied in soybeans.

Soybean treatment, herbicide concentration, rate and application timing	Control (n=3)	Range in Control
Lorox Liquid (480 g/L), 1.8 L/ac (PRE)	99%	98-100%
Dual II Magnum (915 g/L), 0.7 L/ac (PRE) followed by Reflex (240 g/L), 0.4 L/ac + Turbocharge 5 L/1,000L (POST)	98%	94-100%
Dual II Magnum (915 g/L), 0.7 L/ac (PRE) followed by Blazer (240 g/L), 1 L/ac (POST)	97%	90-100%
Dual II Magnum (915 g/L), 0.7 L/ac (PRE) followed by Basagran Forte (480 g/L), 0.9 L/ac (POST)	94%	85-100%
Broadstrike RC (80%), 35 g/ac + Dual II Magnum (915 g/L), 0.58 L/ac (POST)	89%	78-99%
Dual II Magnum (915 g/L), 0.7 L/ac (PRE)	87%	76-93%

Common Ragweed

The biggest challenge with ragweed is that populations resistant to Broadstrike RC, Classic, FirstRate and Pursuit exist and are quite widespread. As with nightshade, "two-pass" strategies are more consistent at controlling common ragweed. (Table 4)

Table 4. Comparative control and range in control of common ragweed with herbicides applied in soybeans

Soybean treatment, herbicide concentration, rate and application timing	Control (n=4)	Range in Control
Boundary (PRE) followed by Reflex (240 g/L), 0.4 L/ac + Turbocharge 5 L/1,000L (POST)	98%	95-100%
Boundary (PRE) followed by Blazer (240 g/L), 1 L/ac (POST)	98%	96-99%
Reflex (240 g/L), 0.4 L/ac + Turbocharge 5 L/1,000L (POST)	81%	75-87%

Sow-thistles

Perennial sow-thistle is more tolerant to herbicides than annual sow-thistle, but they are both extremely difficult to manage. The expectation should be that you will not get 100% control. All herbicides evaluated were extremely variable in their control of these two species as shown in Tables 5 and 6. It is possible to achieve acceptable control when populations are low and environmental conditions are ideal.

Table 5. Comparative control and range in control of annual sow-thistle with herbicides applied in soybean

Soybean treatment, herbicide concentration, rate and application timing	Control (n=5)	Range in Control
Classic (25%), 14 g/ac + non ionic surfactant 2 L/1,000L (POST)	95%	75-100%
FirstRate (84%), 8.5 g/ac + non ionic surfactant 2.5 L/1,000L + 28% UAN 25 L/1,000L (POST)	90%	69-100%
Blazer (240 g/L), 1 L/ac (POST)	88%	65-100%
Basagran Forte (480 g/L), 0.9 L/ac (POST)	86%	33-100%
Cleansweep + 28% UAN	84%	53-100%
Reflex (240 g/L), 0.4 L/ac + Turbocharge 5 L/1,000L (POST)	81%	46-100%

Table 6. Comparative control and range in control of perennial sow-thistle with herbicides applied in soybean

Soybean treatment, herbicide concentration, rate and application timing	Control (n=4)	Range in Control
Cleansweep + 28% UAN	85%	60-100%
Blazer (240 g/L), 1 L/ac (POST)	82%	64-100%
Basagran Forte (480 g/L), 0.9 L/ac (POST)	81%	61-94%
Classic (25%), 14 g/ac + non ionic surfactant 2 L/1,000L (POST)	79%	51-100%
FirstRate (84%), 8.5 g/ac + non ionic surfactant 2.5 L/1,000L + 28% UAN 25 /1,000L (POST)	76%	53-100%
Reflex (240 g/L), 0.4 L/ac + Turbocharge 5 L/1,000L (POST)	74%	54-84%
Pinnacle (75%), 6 g/ac + non ionic surfactant 1 L/1,000L (POST)	73%	45-86%

Key Learnings From Comparative Trials

- "Two-pass" strategies offer the most consistent level of weed control.
- "One-pass" soil applied herbicide programs offer less risk then "one-pass" postemergence herbicide programs since escapes or performance issues are more easily controlled.

This project was funded in part by the Grain Farmers of Ontario and through Growing Forward, a federal-provincial-territorial initiative. The Agricultural Adaptation Council assists in the delivery of several Growing Forward programs in Ontario. The assistance of OMAFRA through the OMAFRA/University of Guelph Partnership is also acknowledged.

"Boron on Trial" for Spring Canola Growers

by Brian Hall, Edible Bean & Canola Specialist, OMAFRA

There has been a great deal of debate about the need for boron on spring canola. It is well documented that boron plays a critical role in proper canola pollination and seed set. This has created quite a bit of interest from growers who have been experimenting with foliar boron applications at early-flowering. Also driving this interest, were the results of an on-farm trial by the first winner of the Canola Yield Challenge in 2005, Ray McCabe of Shelburne. Ray achieved the highest yields in treatments in which boron was included.

Western Canada Results

However, Dr. Rigas Karamanos, a canola fertility expert based in western Canada, concluded after reviewing all the research on boron in canola that there is little evidence that supports the use of boron in canola. Dr. Karamanos also supported OMAFRA's recommendation that the current boron soil test is of no value in assessing the boron status of soils.

Conditions That Favour Boron Deficiency

Ontario soils contain sufficient boron to meet the needs of most crops. Canola and alfalfa both have a high requirement for this micronutrient. Deficiencies in Ontario have only been seen in alfalfa. As management practices and genetics move the yield bar higher in canola and alfalfa, the removal of boron from soils is increasing.

In the soil, boron moves with soil water, so it is subject to leaching. Sandy or gravelly soils, soils with very high pH (pH > 8.5), and low organic soils are prone to low boron levels. Soils east of the Niagara escarpment are particularly prone to be low in boron. Boron shortages on clay and clay loam soils are rare. Organic matter is an important source of boron. Under dry conditions, release of boron from organic matter and the movement in soil water is reduced. Deficiency is more evident on droughty soils under dry conditions. Excessive applications of sulphur have been shown to lower the boron levels in canola plants by reducing the uptake of boron through the roots.

Temperature At Flowering

In a 2007 – 2008 study by Dr. Hugh Earl, University of Guelph, boron applied at early-flower improved yields by 5.7% in 2007, but only marginally in 2008. He surmised the reason for the different response between years, may be related to temperature during flowering and early-pod fill. Canola is a cool season crop, and it has been recognized that 29°C is a critical temperature for canola during flowering (Figure 1). High temperatures interfere with proper flower formation, pollination and results in increased pod abortion. While 2007 was a much more stressful year, with high temperatures during flowering, 2008 had no days over 30°C during pollination. In a 2010 controlled temperature greenhouse study, Dr. Earl was able to show that boron can help mitigate the effects of high temperatures during flowering, reducing pod abortion.

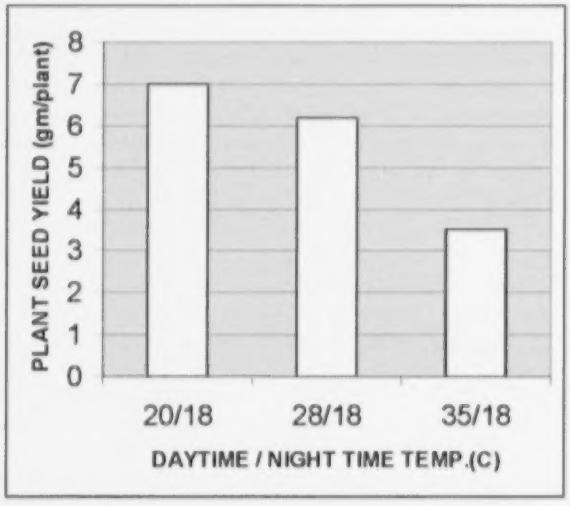


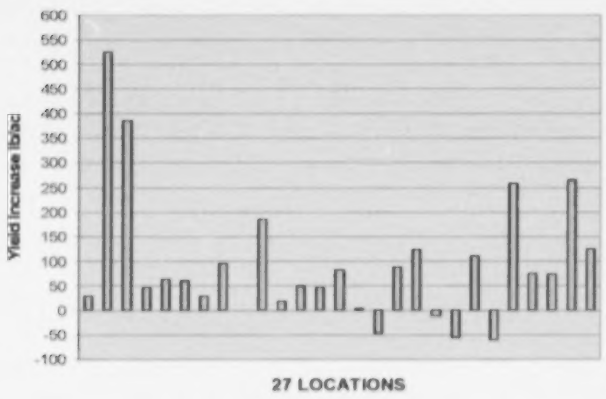
Figure 1. Daytime - Night time temperature impact on canola yield.

Note: Exposure to daytime / night temperatures of 20/18, 28/18, 35/18 °C for 10 days. Seed yield in grams per plant.

Ontario Field Trials Support Foliar Boron Application

In a 3 year (2008-2010) on-farm strip trial, foliar boron applied at early-flower increased yield by 94 lb/ac (3.5%) over the check (Figure 2 – Canola Yield Response To Foliar Boron). Boron application improved yields 78% of the time and improved returns 40% of the time (using a product cost of $5.50/ac + $10/acre application). Trials were field length with 2 replications. Favourable weather during the growing season in all three years of the trial, offered little stress to canola resulting in above average to phenomenal canola yields (1 – 1.6 t/acre).

Figure 2: 2008-2010 Canola Yield (lb/ac) Response to Foliar Boron



Options For Applying Boron

Banding or seed row placed boron can be toxic to plants, and is not recommended. In alfalfa the recommendation to correct a boron deficiency is to broadcast 1 - 2 kg/ha of actual boron, applied annually. The benefit of broadcast and incorporated boron in canola has not been tested in Ontario. If boron is to be applied foliar in canola, the recommended rate is 0.3 – 0.5 lb/ac (0.34—0.56 kg/ha) of actual boron.

Many other field crops have low boron requirements and can be injured by boron applications. Most notable are the grass family, dry beans, cereals, soybeans, corn, and peas. If these crops are to follow in the rotation, do not apply boron the previous fall, or exceed the recommended rate in the previous alfalfa or canola crop.

Manure can also be a source of boron. Manure applied to sandy areas or other suspect areas can also provide organic matter. Boron should not be applied with a herbicide, without first consulting with a specialist.

If you are interested in participating in a foliar boron trial on canola, contact Brian Hall, OMAFRA at 519-271-0083 or by email: brian.hall@ontario.ca

Does Early Planting Along With Late Maturing Varieties Increase Soybean Yields?

by Horst Bohner, Soybean Specialist, OMAFRA

Traditionally, growers plant soybean varieties that will reach maturity based on the projected crop heat units (CHU) for their particular area. This practice is usually combined with planting soybeans in mid-May. One management strategy that consistently leads to higher yields is early planting. Another strategy may be to plant late maturing varieties for a given area. With the introduction of CruiserMaxx seed treatment, higher plant populations can often be achieved under more stressful conditions, making it possible to plant earlier.

Can combining these two management strategies lead to a larger yield increase than using either independently?

An OMAFRA project is currently underway to test the yield benefits while using these two management options in soybean production. The results from 2010 were very encouraging. The yield response of 3 soybean varieties was measured for

- an early planting date (April 15 - May 5),
- a normal planting date (May 6 - 20) and
- a late planting date (May 21 - June 5).

Photo taken June 22, 2010 showing a soybean plant with 7 trifoliates that was flowering. This is ideal for maximum yield.

Varieties were chosen over a range of maturities, ranging from full season maturity up to a full season plus 400 CHU's maturity. Sites were chosen from various heat unit areas from Chatham to Quebec.

2010 Results

The 2010 growing season was exceptional. April was warmer and drier than usual allowing very early planting dates at some sites. With above average temperatures and timely rains throughout the year, yields were very high. There were no significant insect or disease pressures at the test locations. Early planting combined with the great growing season meant that early planted soybeans had outstanding yields. However, the late planted plots also had above average yields.

The yield results for the trials are summarized in Table 1, showing the yield advantage gained for each variety and each planting date. The overall yield loss from later planting across all sites is shown at the bottom of the table.

In this single-year study, the advantage to planting earlier was about 3 bu/ac more than a normal planting date, and 10 bu/ac more than a late planting date. Keep in mind that the late date was before May 26th for some of the sites.

Table 1: Summary of Yield Results for Early Planting Date and Long Day Soybean Varieties

Location and Seed Variety			Planting Date (2010)		
ELORA			29-Apr	20-May	15-Jun
Treat-ment	Variety	Seed Trt[1]	Bu/ac	Bu/ac	Bu/ac
1	2760RY	UN	68.7	66.4	52.7
2	2760RY	CR	70.6	65.0	56.1
3	2960RY	CR	71.3	68.3	55.7
4	3111RY	CR	71.8	67.7	48.4
		Average	70.61	66.85	53.21
		Yield Loss		-3.76	-17.40
SEAFORTH			29-Apr	16-May	25-May
1	28-10RY	UN	51.30	50.10	43.60
2	28-10RY	CR	54.40	47.40	47.50
3	29-60RY	CR	56.50	54.70	51.00
		Average	54.07	50.73	47.37
		Yield Loss		-3.33	-6.70
ST. HUGHUES			13-May	24-May	9-Jun
1	28-10RY	UN	59.58	53.43	48.30
2	28-10RY	CR	61.40	54.78	49.58
3	29-60RY	CR	61.60	60.30	56.50
4	29-10RY	CR	56.58	53.18	54.08
		Average	59.79	55.42	52.12
		Yield Loss		-4.37	-7.68
AYR			24-Apr	4-May	21-May
1	28-10RY	UN	69.40	70.00	63.90
2	28-10RY	CR	73.00	71.80	65.40
3	29-10RY	CR	76.50	74.60	74.40
		Average	72.97	72.13	67.90
		Yield Loss		-0.83	-5.07

Location and Seed Variety			Planting Date (2010)		
CDL[2]			26-Apr	13-May	23-May
Treat-ment	Variety	Seed Trt[1]	Bu/ac	Bu/ac	Bu/ac
1	28-10RY	UN	55.10	58.10	51.50
2	28-10RY	CR	56.30	58.70	53.80
3	29-60RY	CR	61.90	45.80	60.60
		Average	57.77	54.20	55.30
		Yield Loss		-3.57	-2.47
CHATHAM			20-Apr	17-May	4-Jun
1	31-11RY	UN	99.40	90.60	69.60
2	31-11RY	CR	105.9	88.80	58.70
3	33-10RY	CR	102.6	91.60	67.90
4	RC3125	CR	96.30	94.40	68.30
		Average	101.05	91.35	66.13
		Yield Loss		-9.70	-34.93
RIDGETOWN			29-Apr	26-May	12-Jun
1	31-11RY	UN	50.63	50.22	41.50
2	31-11RY	CR	50.32	50.73	43.45
3	33-10RY	CR	46.98	48.40	41.91
4	RC3125	CR	43.68	45.07	39.34
		Average	47.90	48.60	41.55
		Yield Loss		0.70	-6.35
KEMPTVILLE			24-Apr	7-May	17-May
1	2760 RY	UN	67.24	65.13	70.14
2	2760 RY	CR	62.07	69.65	66.13
3	2960 RY	CR	79.58	85.16	89.23
4	3111 RY	CR	95.02	90.21	89.31
		Average	75.98	77.54	78.70
		Yield Loss		1.56	2.73
ALL SITE AVERAGE		Total Average Yield	67.52	64.60	57.78
		Yield Loss	-	-2.91	-9.73

[1]UN = no seed treatment, CR = cruiser maxx seed treatment
[2]CDL = Coteau-du-lac, Quebec.

Does Early Planting Along With Late Maturing Varieties Increase Soybean Yields?

According to the findings so far, the simple answer is yes. Yes, planting early with later maturing soybean varieties can increase a producer's chances of a higher yielding soybean crop. "Early" planting can have a 3 bu/ac advantage over a "normal" planting time and nearly a 10 bu/ac advantage over a "late" planting window. This is a significant improvement considering it costs nothing to plant early.

On average, the longest day varieties yielded more than the adapted varieties. However, these results are less clear, more site year data will be necessary to confirm this. In some cases, the adapted variety was still the best yielding as long as it was planted early. The findings so far showed that planting a very late maturing bean past the middle of May will result in significant yield reductions and is not recommended.

Acknowledgements

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GMO Alfalfa

by Hugh Martin, Organic Crop Production Program Lead, OMAFRA

In January 2011, the USDA deregulated the planting of genetically modified alfalfa. The current trait of interest is for tolerance to glyphosate, also known as Roundup Ready (RR). It is expected that RR alfalfa will be planted in the USA in 2011. The RR alfalfa trait was approved for use in Canada in 2005, but has not yet been commercialized for use on farms. Currently in Canada, there are no registered varieties of RR alfalfa, and glyphosate is not registered for this use on alfalfa. However, eventually it will likely be grown here as well. To understand the potential risks, we need to understand how alfalfa is currently grown and how GMO (genetically modified organism) alfalfa may potentially spread.

Limited Utility of This Trait In Ontario

In Ontario, most alfalfa is planted in mixtures with 10-30% perennial grasses. Grasses are planted to improve feed value, harvestability, and palatability for the livestock. RR alfalfa is only appropriate for use in pure alfalfa fields, which has not been the general preference of producers in Ontario. Spraying a typical hay field with glyphosate would kill all perennial grasses. The current practices of underseeding alfalfa mixtures with cereals for establishment, and short rotations of less than 3 - 4 years for the hay crop reduces the usefulness of this type of herbicide trait.

In the future we will likely see more types of GMO alfalfa introduced that may include increased yields, improved winterhardiness, or improved digestibility or other feed traits. These traits may have greater usefulness and potential for commercialization in Ontario.

Potential For Genetic Contamination Within Alfalfa Fields

A primary concern of GMO alfalfa is pollen drift and the pollination of non-GMO alfalfa plants. RR alfalfa will likely see its greatest utility in intensively managed alfalfa fields that are harvested in a 3-5 cuts per year system before the crop flowers. This early cutting would eliminate pollen spread. For seed to be produced the alfalfa would have to remain standing for another 4-6 weeks after flowering. This could happen if the pollen spreads to feral alfalfa plants that are growing outside the field boundaries. Feral alfalfa should be eliminated near seed fields where this is a risk. Care also needs to be taken at seeding to avoid seed spills of GMO seed and allowing seed to be spread into non-harvested areas.

Alfalfa plants are "autotoxic". If an alfalfa plant produces seed and that seeds falls to the ground it will not likely be able to produce a healthy plant within about 15 cm of an existing mature alfalfa plant. Adjacent grass plants in the stand also outcompete these new alfalfa seedlings. This reduces the chance of pollen from another field creating GMO plants within a non-GMO field.

Potential For Genetic Contamination In Seed Production

Most of our alfalfa seed is produced in western Canada or USA. The main concern will be to ensure the purity of the non-GMO seed. Isolation distance guidelines for alfalfa seed production will need to take this into account, as will other seed handling practices. Most alfalfa pollination is by leaf cutter bees that do not travel as far as honey bees.

Manage Potential Risks

Organic prohibits GMO. Organic farmers must manage their farms to reduce the chances of GMO in their organic products. Similar to pesticides, GMO's are part of the farm environment, and we must learn how to manage any potential issues arising from their use.

Another article discussing this issue is **Understanding Roundup Ready Alfalfa** by Dr. Dan Undersander, University of Wisconsin at: http://hayandforage.com/Understanding_Roundup_Ready_Alfalfa_revised.pdf
Other articles on biotech alfalfa and coexistence of genetically engineered traits are available on the National Alfalfa & Forage Alliance website at: http://www.alfalfa.org/CSCoexistenceDocs.html

Temporary Field Storage of Manure In Winter

by Christine Brown, Nutrient Management Lead – Field Crops, OMAFRA

The opportunity to get bedded-pack cattle manure was too good to pass up. But now as the field in front of me is a sea of white with deep drifts, one question arises, "Where is the best location to temporarily store the manure?"

Temporary field storages are an alternative to field applied manure on snow covered and frozen fields. Temporary field storages can be a great solution to limited barn storage of manure and can also be a time saver during the busy spring season for transporting manure. However, when the snow is deep and the ideal place for a temporary storage may not be easily accessed, what are the options?

There are guidelines that help determine the best place for temporary storages. They are in place to minimize the risk of contaminating water sources and also to help prevent complaints from local residents.

1 **How solid is the manure?**
The more bedding in the manure, the greater the dry matter content and the less likely the manure will move.
2 **Is the manure nutrient rich?**
The more concentrated the nutrient content of the manure (ie from broilers), the more risk that some of the nutrients will move through leaching or volatilization. Concentrated manures would ideally be stored until field application on a concrete pad, where runoff is collected or prevented through coverage.
3 **Where are the field tiles located?**
A tiled field is not the best location for a manure pile. Temporary storages should have at least 3 meters (10 ft) between the edge of pile and the nearest tile drain. Storages should also be located away from exposed bedrock.
4 **What is the soil texture?**
Sandy or light textured soils (Hydrologic group A soils) are risky for temporary storages. Infiltration in the spring will increase the risk of nitrogen leaching.
5 **Distance to neighbours or watercourses.**
No one likes a manure pile beside their property, especially if there are odours or flies associated with the temporary storage. It should take about 2 to 3 minute to walk to a temporary storage from the edge of a field (100 m from edge of field or 125 m from the nearest residence).
6 **Distance to water or surface inlets.**
We all know that manure needs to stay out of water, whether a river or water course, a catch basin or areas where water flows or floods during spring melts. A 3 minute walk (~150 m) to get to the water source ensures that there is adequate distance to minimize risk of nutrient contamination.
8 **Should the temporary storage be covered?**
Covering a storage is much easier said than done, and usually isn't very practical for short term storages. However, covering a storage with a tarp would be warranted when there is increased risk for an adverse effect. For example, tarping a temporary storage of heavily bedded broiler manure with a high concentration of nutrients, will ensure that the nutrients will still be in the pile at the time of field application.
9 **How long is "temporary"?**
Although it seems obvious, manure piled in the field as temporary storage should be applied to the field to meet the upcoming growing season's crop needs. In a few cases, temporary storages have been in place until grain harvest. In those situations, extra precautions should be taken to ensure that environmental risks (including odours and insects) are minimized.

Temporary field storages are regulated under the Nutrient Management Act. Farms not phased in to nutrient management regulations are encouraged to follow the guidelines. Information regarding the specifics of temporary manure storages can be found on the OMAFRA website at: http://www.omafra.gov.on.ca/english/engineer/facts/10-039.htm.

Planning For the 2011 Grazing Season

by Jack Kyle, Grazier Specialist, OMAFRA

What will the 2011 grazing season be like? If past years can provide any guidance, at some point it will be too dry, too wet, too much forage to graze and not enough forage to graze. A little bit of planning and preparation at the beginning of the season can pay big dividends by the end of the year.

Budget Grazing Inventories
The first step is to take inventory of what you have and what you need. Estimate the pounds of grazing livestock you will have each month. They will require about 3% of their body weight in dry matter each day.

Now estimate how much production you will get from your pastures. A very good to excellent pasture should produce 5,000 lbs of dry matter per acre. However, 60% of this will come in May and June, and the remaining 40% over the following 3 to 4 months.

Do you have enough feed to get you through to the end of October? What about November and December?

Example Budget
Table 1 budgets for 100 ewes weighing 150 lbs, and 150 lambs weighing 30 lbs at the beginning of the grazing season and gaining 1/3 of a lb per day. You can substitute your own numbers using this example.
This budget assumes the lambs are eating forage.

Although they maybe getting more of their energy from milk, the ewe will be eating slightly more forage to produce that milk. It is important to determine the total pounds of animals that are on the pasture. Their daily pasture forage requirement (dry matter basis) can then be calculated as 3% of their body weight.

The Table estimates the pasture production based on monthly totals. This will vary from field to field and to a certain extent on the weather. Note these numbers are estimates and each farm will vary. Use your own assumptions.

Strategies

As we can see in this example, June has a lot of pasture available. This could be made into hay or if well managed, provide carryover for July and August.

In August, we have a major shortage. How can you meet the requirement?

- Feed hay made in June,
- Graze the second growth on hay fields,
- Plant an annual crop to supplement (sorghum-sudan, turnips, cereals, corn). These annuals could also be used for September and October pasture.

Moving the lambs to a feedlot in August or September could also have a significant impact on the amount of pasture required.

A rotational grazing system that moves livestock every day or two leaves a good residual amount of forage in the field. This maintains a strong root system that will help "drought proof" your pasture, resulting in improved July and August production.

The quality of the pastures will vary and adjustments will be required. By moving livestock quickly in the times of rapid growth (May and June) you will leave significant forage behind which will be grazed in July and August, thus helping to balance the demand.

With a feed budget you have the beginnings of a great pasture season and can be prepared to make adjustments as you go.

Refer to "Budgeting and Measuring Pasture Production" at: http://www.omafra.gov.on.ca/english/crops/field/news/croptalk/2010/ct-0910a7.htm.

Table 1 – Calculation of Monthly Forage Pasture Requirements

	May	June	July	August	Sept	Oct	Nov
100 ewes @ 150 lbs	15,000	15,000	15,000	15,000	15,000	15,000	15,000
150 lambs @ 30 lbs, ADG .33 lbs	5,250	6,750	8,250	9,750	11,250		
total body weight (lbs)	20,250	21,750	23,250	24,750	26,250	15,000	15,000
3% of body weight (lbs) = pasture dm required per day	607	652	697	742	787	450	450
Pasture dm production per acre	1200	1800	1000	500	600	300	
acres to meet requirements	15.7	10.9	21.6	46.0	39.4	46.5	Stockpile

So Long, and Thanks!

by Keith Reid, Soil Fertility Specialist, OMAFRA

On February 15th of this year, I embarked on a new adventure with the Agri-Environment Services Branch of Agriculture and Agri-Food Canada, as the Manager of Soil Nutrients and Greenhouse Gases for Eastern Canada. I'm excited about the new challenges, but also sad to be closing a fulfilling chapter in my life with OMAFRA. During the past 22 years, I have been privileged to work with an unparalleled group of colleagues, both within the Ministry and among the many farmers and industry agronomists. Nothing I have accomplished has been without the support of many people. I'm particularly grateful to those of you who "have your boots dirty" for your willingness to question, to challenge and to teach me, so that I could continue to contribute to your success in a meaningful way.

So what profound message can I leave with you as I head out the door? Always keep looking for better ways to do what you do, but don't forget the basics and don't accept anyone's claims at face value. Work together to test new ideas, and make sure you test them carefully enough that you can be confident in the results. As the tag line on my email has said for the past few years, "Always keep an open mind…but not so open that the breeze blows through."

While I am moving to a new job, in a different branch of government, I will be dealing with many of the same issues. I will also be striving very hard to work collaboratively with my provincial colleagues, and with organizations like OSCIA. In other words, while I am moving, I'm not moving very far. I look forward to seeing many of you again in the future.

Good Soil Structure Essential for Optimum Crop Growth

by Adam Hayes, Soil Management Specialist, OMAFRA

The question is often asked, "What can I do to improve my crop yields?" Obviously there are a lot of factors that contribute to crop yield, but the soil the crop is growing in has a big influence. There are a lot of aspects of the soil that impact crop growth including soil texture, drainage and fertility. One thing that interacts with these and other aspects is soil structure. A well structured soil can produce tremendous crop yields. Consider the crop growth in a field that has recently been taken out of pasture, grass, or some other area that was recently brought into crop production. That soil may have higher organic matter levels, but it also usually has very good soil structure.

Soil Structure

Soil texture refers to the percent of sand, silt and clay in a soil. Soil structure describes the arrangement of the organic and mineral particles into aggregates (clumps of soil) or granules of different shapes, sizes and porosities. Soil scientists describe a desirable soil structure as one that is composed of aggregates that are:

- water stable, do not collapse when wetted
- porous
- variable in size, ranging from small (1 mm) to large aggregates (2 to 5 mm).

Soil structure impacts crop growth in many ways. A well structured soil will be porous, and that allows air into the soil, water to move through the soil and roots to grow more easily. A good structured soil is also more resistant to wind and water erosion and soil compaction. A soil with poor structure is more prone to crusting. Soil compaction can cause a loss of structure and impact root growth and water movement.

Larger Aggregates

The percentage of larger aggregates is a measure of soil structure. Research has shown that sod and hay crops greatly increase the percentage of larger aggregates (continuous sod 85%, second year hay 74%). Continuous corn had a low percentage (22%) of larger aggregates. Corn and oats in rotation were intermediate at 52% and 56% respectively.

Aggregate Stability

Aggregate stability is another indicator of soil structure. It is one of the measures in the Ontario soil health assessment project. Table 1 shows the aggregate stability from several situations in long term tillage and rotation plots.

Aggregate stability measurements on the long term tillage plots at Elora (silt loam) were:

- 57% for no-till,
- 42% for fall chisel plow,
- 26% for fall moldboard plow,
- 48% for fall offset disc and
- 47% for spring tandem disc (twice).

Table 1. Wet Aggregate Stability--Long term tillage and rotation research plots

		Wet Aggregate Stability	
Location (soil texture)	**Rotation**	**Conve-ntional till**	**No-till**
Delhi (sandy loam)	continuous corn	65	80
	soybean - winter wheat	71	80
Ridgetown (clay loam)	continuous corn	15	44
	corn - soybeans	22	35
	corn – soys - winter wheat (RC)	30	49
	continuous soybeans	15	56
	soybeans - winter wheat	29	70
Elora (silt loam)	alfalfa – alfalfa – corn - corn	48	60
	continuous alfalfa	79	72
	continuous corn	19	58
	corn – corn – barley (RC) – oats (RC)	33	60
	corn – corn – barley - oats	29	44
	corn - soybeans	23	39
	corn – soybeans - winter wheat (RC)	43	45
	corn – soybeans - winter wheat	36	48

The moldboard plow, chisel plow and fall offset disc were cultivated and packed in the spring before planting.

Improving Soil Structure

So how can soil structure be improved? Soil particles are held together by the clay and organic matter in a soil. Crop residue breakdown, excretions from various forms of soil life, root growth, dry cracking, and freeze thaw of soils, all contribute to the formation of soil structure. Adding a variety of organic materials to the soil will encourage soil life and produce more of the "glues" that hold soil particles together. Growing a variety of crops in rotation will add organic matter. The roots, especially cereal and grass crop roots, will help in soil structure formation. Reducing tillage will also reduce the breakdown of aggregates and soil structure.